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11PS  
OJCS # 1957/76

PSG/AID-033/76  
21 January 1976


MEMORANDUM FOR: Executive Officer, OJCS

SUBJECT : NPIC Comments Regarding NBS Memorandum, 24 November 1975;  
Revised Implementation Instructions for ASCII

1. NPIC is ready to comply with the provisions set forth in the proposed Federal Processing Standard Publication (FIPS PUB 1-1).

2. As a COINS host computer, utilizing the U-494 computer, the Automated Information Division (AID) has been converting NPIC data for many years to ASCII format for network transmission and use. Our internal code is primarily fielddata (FD, 6 bits) and we do not anticipate FY-76-77 change relative the COINS support involving this computer system. My understanding of the revised instructions for ASCII clearly indicates that a waiver is not required and that we are in compliance with the intent of the new policy and standard. Nevertheless, we considered this standardization possibility in our plans for a new computer system several years ago. With the acquisition of the U-1110 in 1974, AID fully adopted ASCII to eliminate future conversion problems and to ensure compliance with proposed and existing federal standards for internal processing as well as electrical data communications functions.

3. I endorse Agency adoption of this standard as the future direction of internal computing, data exchange and telecommunication activities. Occasional waivers will be necessary, but they should be the exception and easily justified.

  
Chief, Automated Information Division,  
PSG/NPIC

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**UNITED STATES DEPARTMENT OF COMMERCE**  
**National Bureau of Standards**  
Washington, D.C. 20234  
Institute for Computer  
Sciences and Technology

1975 November 24

MEMORANDUM FOR FIPS Points of Contact

From: Harry S. White, Jr., Associate Director  
for ADP Standards *Harry S. White, Jr.*

Subject: Revised Implementation Instructions for ASCII

Enclosed is a proposed Federal Information Processing Standard Publication (FIPS PUB 1-1) that provides revised implementation instructions for the use of ASCII (American Standard Code for Information Interchange) as a Federal standard. This revision, when approved by the Secretary of Commerce, will supersede existing FIPS PUBS 1 and 7. (See Explanation and Approving Authority Sections of enclosure for additional details.)

This proposed revision is provided for the consideration of each Federal department and agency and will also be published in the Federal Register to obtain the comments of the industry, state and local governments and the public. In particular, we would like to have information concerning the potential cost impact on the interchange of data and programs as proposed in sections (h) and (i) of the Implementation paragraph. Could these costs be reduced if the implementation period were extended to twenty-four or thirty months?

Responses and recommendations from your agency are requested and should be furnished within 90 days of the date of this letter to the Associate Director for ADP Standards, Institute for Computer Sciences and Technology, National Bureau of Standards, Washington, D.C. 20234. Your concurrence will be assumed if a response is not received within the 90 day period.

Enclosure

cc: State Information Systems Coordinators



FIPS PUB 1-1  
Supersedes  
FIPS PUB 1  
November 1, 1968 and  
FIPS PUB 7  
March 7, 1969

Federal Information  
Processing Standards Publication 1-1

(date)

Announcing the Standard for

CHARACTER CODES AND COLLATING SEQUENCE (FIPS 1-1)

Federal Information Processing Standards are issued by the National Bureau of Standards to provide for the more economic and efficient purchase, lease, maintenance, operation and utilization of automatic data processing equipment and services by Federal departments and agencies. These standards are issued pursuant to the Federal Property and Administrative Services Act of 1949 as amended, Public Law 89-306 (79 Stat. 1127), as implemented by Executive Order 11717 (38 FR 12315, dated May 11, 1973), and Part 6 of Title 15 CFR (Code of Federal Regulations).

Name of Standard. Character Codes and Collating Sequence (FIPS 1-1).

Category of Standard. Hardware Standard, Interchange Codes and Media.

Explanation. This standard provides a coded character set and collating sequence to be used in Federal information processing systems, telecommunications systems and associated equipments and software. This standard was developed to achieve greater compatibility among computer and telecommunications systems applications thereby affording users the capability of making more effective utilization of their data, software and equipment resources. It is intended to serve as the basic standard for representing, in a binary coded form, the graphic characters and controls that are commonly used in the collection, processing, interchange and storage of information. In this sense, this standard is as basic for computer and telecommunications applications as an alphabet is to effective human written communications. This standard, in addition to being approved and endorsed for Federal government use, has been approved and endorsed as a national and international voluntary standard. It serves as the international standard for data transmission and has been widely implemented by many electronic computing and communications equipment manufacturers in the design of their hardware and software products.

This FIPS PUB reaffirms the continued use of the American Standard Code for Information Interchange (ASCII) as a Federal standard and provides further implementation instructions for its effective use by Federal departments and agencies. The implementing instructions provided herein supersede those contained in FIPS PUB 7 dated March 7, 1969. This FIPS PUB also supersedes FIPS PUB 1, dated November 1, 1968. These revised instructions for implementation are based upon recommendations resulting from a study conducted by NBS on the significance and impact of ASCII as a Federal standard which was accomplished with the cooperative efforts of Federal departments and agencies, the computer industry and non-government users.

Approving Authority. On March 11, 1968, the President of the United States approved ASCII as a Federal standard. On March 7, 1969, the Secretary of Commerce provided implementing instructions for the use of ASCII as a Federal standard. This earlier approval and implementing instructions were promulgated by NBS through FIPS PUBs 1 and 7. Executive Order 11717 of May 9, 1973 transferred to the Secretary of Commerce the function of approving standards on behalf of the President. This revised standard and implementing instructions are approved by the Secretary of Commerce pursuant to section III (f) (2) of the Federal Property and Administrative Services Act of 1949, as amended.

Maintenance Agency. Department of Commerce, National Bureau of Standards (Institute for Computer Sciences and Technology).

Cross Index.

- a. American National Standard X3.4-1968, Standard Code for Information Interchange.
- b. ISO Standard 646-1973, 7-Bit Coded Character Set for Information Processing Interchange.
- c. CCITT Recommendation V3, Vol. VIII, Green Book, 1972, International Alphabet #5.
- d. American National Standard X3.41-1974, Code Extension Techniques for Use with the 7-Bit Coded Character Set of American National Standard Code for Information Interchange (FIPS PUB 35).
- e. ISO Standard 2022-1973, Code Extension Techniques for Use with the ISO 7-Bit Coded Character Set.

Applicability. This standard is applicable to the representation of character coded information used in information processing and telecommunications applications and among related equipments and software.

Implementation.

- a. Effective Date: Effective upon the publication date of this FIPS PUB, all Federal departments and agencies will implement this standard as specified herein.
- b. Agency Monitoring Official: Each department and agency head will designate an official who is responsible for monitoring the implementation of this standard within the computer and telecommunications systems of their department or agency. The name and address of this official will be reported to the National Bureau of Standards within thirty days of the date of this FIPS PUB.
- c. Agency Implementing Directives: Each department and agency will issue implementing directives for the use of this standard within their organization. Two copies of these implementing directives will be provided to the National Bureau of Standards within 120 days of the publication date of this FIPS PUB.
- d. Acquisition of New Systems: All computer and telecommunications system hardware, software and services acquired for Federal use on or after the date of this FIPS PUB must have the capability to accept, generate and process character coded data and programs recorded in accordance with the code and collating sequence provided by this standard unless a waiver has been obtained in accordance with the waiver procedures provided herein.
- e. Procurement Regulations: The General Services Administration will provide regulations concerning the use of this standard in Federal acquisitions of applicable equipment, software and services.
- f. Compliance Testing: All computer and telecommunications systems and applicable components acquired after the date of this FIPS PUB will be tested before acceptance to assure that these are capable of accepting, processing and generating data and programs that are represented in accordance with this standard.
- g. Benchmarking: When computer or telecommunications systems and/or appropriate components are tested (benchmarked) as a basis for evaluating vendors' proposals, these tests (benchmarks) will be performed using the character codes and collating sequence prescribed by this standard. This provision applies only to character coded data. Binary, packed decimal and floating point numeric data need not be converted to character codes for such tests.
- h. Interchange of Data: Within eighteen months of the date of this FIPS PUB, all departments and agencies which are authorized to provide or collect character coded data from other Federal agencies or the public will provide the capability of generating or accepting their character coded data recorded in accordance with the provisions of this standard. Where there is a charge for such services, the charge for data recorded in accordance with this standard will be made available at a cost no greater than data recorded in a non-standard form.

i. Interchange of Programs and Software: Within eighteen months of the date of this FIPS PUB, all computer programs and associated software that are subject to interchange will be designed to function and will be recorded in accordance with the provisions of this standard. (It is essential in computer program design to assure that all comparisons are performed based upon the collating sequence provided by this standard. Otherwise, incorrect results can be obtained or invalid operations can occur.)

j. Use in Telecommunications Systems Networks: This standard has been adopted as a standard character code for use in Federal telecommunications systems networks. In these network applications, unless otherwise specified and arranged for, all character data submitted to or received from these networks will be represented in accordance with the provisions of this standard. This implementation does not preclude the transmission of numeric data in a binary, packed decimal or floating point form when these forms of numeric representation of data are more effective; nor does it preclude the use of bit-oriented control procedures and formats for transmission control purposes.

k. Use of Non-standard Codes and Collating Sequences: Where interchange of data and/or programs is not involved, existing equipment and files need not be converted to conform to this standard until such time as replacement systems are specified. However, the continued use of non-standard character codes and collating sequences will not be cited as a requirement when replacement systems are acquired. After new or replacement systems are installed that comply with this standard, the standard character code and collating sequence for representing operational data files, programs and software will be used in order to avoid unwarranted conversions and reduced operational performance and to facilitate the authorized exchange of data, programs and software.

l. Other Applicable Standards: This standard is equally applicable to other standards that cite its use in recording data on media or in other data processing or communications applications. Appendix A provides a list of those standards that have also been approved and are applicable to the use of this standard. Additional standards and revisions, as these are developed and approved, will be provided by NBS in the FIPS publications series.

Specifications. This standard adopts, in whole, the current version of American National Standard X3.4, Standard Code for Information Interchange.



Qualifications. The collating sequence of characters as provided by this standard is defined by their binary values and is the standard sequence. However, this does not preclude the ordering of files in other sequences to meet special requirements (e.g. files that are sequenced based on proper names or in other instances where the case distinction of the alphabetic characters is to be ignored).

Representation of this standard code in eight-bit environments shall be in accordance with FIPS PUB 35, Code Extension Techniques in 7 or 8 Bits. The standard collating sequence applies only to the 128 characters defined by the seven-bit code as defined by American National Standard X3.4-1968.

Waiver Procedures.

a. Heads of Federal departments and agencies or their duly authorized designees may waive the implementation of this standard when it has been determined that its use would seriously affect the capability of the department or agency to effectively perform its mission responsibilities. Waivers submitted for approval will contain complete justification based upon economic, operational and technical reasons therefor. Life cycle cost and performance will be addressed in addition to the initial acquisition considerations. Approved waivers and justifications not involving procurements will be submitted to the Office of the Federal Register, National Archives and Records Service within seven days after approval for subsequent publication as a notice in the Federal Register. Where the approved waiver pertains to a procurement action, the submission for notice in the Federal Register will be within seven days after the formal release of the solicitation document.

b. Waivers are not required in the following instances:

1. For equipment installed or on order prior to the date of this FIPS PUB.
2. Where procurement actions are into the solicitation phase (i.e. Request for Proposals or Invitation for Bids have been issued) on the date of this FIPS PUB.
3. When augmenting existing computer installations with additional peripheral or related equipment that must continue to process files recorded in non-standard codes.

c. The National Bureau of Standards will provide technical assistance to agencies relative to their waiver requirements when requested.

Special Information. The National Bureau of Standards is developing techniques to assist Federal departments and agencies in making conversions from non-standard

codes. Also, NBS has under development tests for determining the extent that products are in compliance with this standard. When available, these will be announced by NBS for general use.

Where to Obtain Copies of the Specifications of the Standard.

a. Federal Government activities should obtain copies from established sources within each agency. When there is no established source, purchase orders should be submitted to the Office of ADP Standards Management, National Bureau of Standards, Washington, D.C. 20234. A catalog of standards with current prices is available from this NBS office.

b. Others may obtain copies from the American National Standards Institute, (ANSI), 1430 Broadway, New York, New York 10018. Refer to X3.4-1968, Standard Code for Information Interchange. A catalog with price information is available from ANSI.

APPENDIX A  
ASSOCIATED ASCII STANDARDS ADOPTED FOR FEDERAL USE

- FIPS PUB 2, Perforated Tape Code for Information Interchange (X3.6-1965).
- FIPS PUB 3-1, Recorded Magnetic Tape for Information Interchange (800 CPI, NRZI) (X3.22-1973).
- FIPS PUB 14, Hollerith Punched Card Code (X3.26-1970).
- FIPS PUB 15, Subsets of the Standard Code for Information Interchange.
- FIPS PUB 16, Bit Sequencing of the Code for Information Interchange in Serial-By-Bit Data Transmission (X3.15-1966).
- FIPS PUB 17, Character Structure and Character Parity Sense for Serial-By-Bit Data Communication in the Code for Information Interchange (X3.16-1966).
- FIPS PUB 18, Character Structure and Character Parity Sense for Parallel-By-Bit Data Communication in the Code for Information Interchange (X3.25-1968).
- FIPS PUB 22, Synchronous Signaling Rates Between Data Terminal and Data Communications Equipment (X3.1-1969).
- FIPS PUB 25, Recorded Magnetic Tape for Information Interchange (1600 CPI, Phase Encoded) (X3.39-1975).
- FIPS PUB 32, Optical Character Recognition Character Sets (X3.17-1975) and (X3.49-1975).
- FIPS PUB 33, Character Set for Handprinting (X3.45-1974).
- FIPS PUB 35, Code Extension Techniques in 7 or 8 Bits (X3.41-1974).
- FIPS PUB 36, Graphic Representation of the Control Characters of ASCII (X3.32-1973).
- FIPS PUB 37, Synchronous High Speed Signaling Rates Between Data Terminal Equipment and Data Communications Equipment (X3.36-1975).